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This study conducted at the University of Kentucky in 1967-68 tests the theory of interaction between discrimination and pronunciation through a field test. After a brief review of previous research in phonemic discrimination as related to foreign language learning, the procedures and results of the test are presented. The text used was "Basic French: A Programmed Course" by Mueller and Niedzieldski. A quantitative analysis and impressionistic evaluation of the test are included, and there is discussion of the procedures and variables involved. It is concluded that discrimination training seems to be an effective training device in the learning of pronunciation. (JH)

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The Influence of Discrimination Training on Pronunciation

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Introduction

Discrimination training has become an important tool in foreign language programs. It teaches the student to distinguish between a correct and an incorrect sound or utterance before he pronounces the same. It was felt that the ability to identify what is a correct utterance and reject an unacceptable approximation is necessary in a self-instructional program. Since there is no instructor to give confirmation when a correct utterance is made and withhold it in the contrary case, the student must learn to judge his own responses.

Studies in accoustic perception lend support to theory that discrimination and articulation are intimately related and suggest that discrimination training will have a direct effect on the student's pronunciation: Hebb proposes the concept of "identity" in perception. Such "identity" rests on familiarity with the sight or the sound and is easily remembered only when the stimulus is well known. "Identity is a matter of degree and depends on a considerable degree of experience".[1] It is suggested here that discrimination training teaches the student a sound-image which in turn influences his own pronunciation.

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In addition to imparting such an identity of the various sounds, sound patterns and intonation patterns, it teaches the student to listen as he has never listened before, and may restore a skill which he possessed when he was young but gradually lost in the educational process.

The Problem

The study intends to test the theory of interaction between discrimination and pronunciation through a field test. The following questions seem worthy of attention:

1. Does discrimination training influence pronunciation performance?
2. What group of students in reference to their aptitude would benefit most from discrimination training?
3. If an improvement in pronunciation can be demonstrated then what kind of improvement is most evident. Is it the sounds? or the intonation features primarily? or are the sounds and intonations features so intimately interwoven that it is a general improvement of pronunciation or none at all?

Previous Research

Pimsleur, Mace, and Keislar (1961)[2] in their investigation of preliminary discrimination training report that "training in discriminating the nasal vowels --/õ/--, /ã/--and/ẽ/--rendered subsequent language laboratory practice more effective

in producing good pronunciation of these phonemes". They attribute the effectiveness of discrimination training to the fact that "students were required to make an overt response circling the word heard and received immediate information as to the correctness of their response." They also found that discrimination between French --/o/-- and English glided --/ow/-- did not render language laboratory practice measurably more effective in producing good pronounciationof this French phoneme." They suggest that the lack of effectivenss in that case was due to the fact that "the problem was not one of discrimination but one of differenciation." They felt that since a motor skill was involved the proper pronunciation was improved by practicing the sound "not by classifying other peoples pronunciation as good or bad."

However, their study did not account for the fact that the segmental phonemes of the target language are influenced by the supra-segmentals of the native language: the pitch configuration within the syllable, syllable length, and stress features. Delattre's pronunciation drills,[3] dating back to Middleburry, are posited on the fact that English syllabication habits cause pronunciation deterioration. Discrimination training to be effective therefore, should have been taught also for the supra-segmental phonemes. Failure to have done that is probably responsible for the fact that the student's pronunciation did not improve for --/o/--.

Lane and Schneider,[4] investigated self-shaping of tonemes

in Thai under various learning conditions. They found that echoic accuracy of such a toneme improved slightly when discrimination training and auditory feedback of the students responses were used. It improved markedly when visual feedback of the student's responses was displayed.

Lane and Schneider did not use the type of discrimination training now available with instant and visual confirmation and thus were unable to establish an "identity" with which the learner would compare his own responses.

William A. Hemming,[5] in his study under the Indiana Language Program concludes that: (1) subjects who received discrimination training during the study were better able to discriminate French sounds from each other and from English sounds, than subjects who received no discrimination training but received pronunciation practice instead. (2) "The subjects who received discrimination training without pronunciation practice were able to pronounce the sounds of French with greater accuracy than those who received pronunciation practice without discrimination training."

Procedure

The field test at the University of Kentucky included 180 students during the Fall semester of 1967 who received no discrimination training and 63 students in the Spring semester of 1968 who received discrimination training as described below. Basic French A Programmed Course, by Mueller and Niedzielski [6]

was used in both semesters. In the Fall semester, publication of the book having been delayed, the students had to use an old test edition without discrimination training. In the Spring semester after its publication, discrimination training was a part of the training given in Part I. All pronunciation learning was done in the language laboratory using the tapes, but without discrimination training (Fall) and with discrimination training frames (Spring semester).

The discrimination training consisted in presenting a sequence of random correct and incorrect utterances to be evaluated as either acceptable or unacceptable. In order to teach the ability to identify the correct and to reject the incorrect utterances as behavior the utterances were presented in rapid sequence with no more than one second interval between them. The student could not think about or mouth what he thought he heard so that perception based on muscular involvement was eliminated.

Since confirmation to be effective must occur immediately after the response is made and since a visual record of his judgements is desirable, the responses were printed in ACCESS, an invisible ink process which when the student marks his choice with his ACCESS pen, he receives immediate confirmation; a grey dot appears if his judgement was correct, nothing but a faint yellow mark if his judgement was incorrect. First the student was taught to discriminate between intonation features such as syllable length,

stress and pitch, then he learned to discriminate the individual sound and finally he was trained in "spelling discrimination," that is, he was asked to judge whether the utterances which he saw in print were spoken correctly or not. In this latter stage such features as liaison factors and syllabification habits were taught, as well as the sounds that were now exposed to graphemic interference.

The student population was evaluated in both semesters by the MLAT.[7] The following chart illustrates the distribution of aptitude in the two semesters. Two scores were given: The score obtained in Part II of the test which measures: "sound--symbol association ability--and may measure a sort of memory for speech sounds. It tends to correlate highly with the ability to mimic speech sounds and sound combinations".[8] The total score form which the percentile ranking is established is also given:

	Fall	Spring
Average Part II Score	23	22
Average MLAT total score	118	109
Average Percentile Ranking	50%ile	40%ile

The pronunciation training periods lasted for nine weeks in both cases. Class work during that time was minimally concerned with pronunciation. The teaching assistants, who taught the various sections and were not aware that this study had been undertaken, were instructed to concentrate on vocabulary learning and the few grammatical features which were included in Part I. Whether the various instructors had any influence on their pronunciation

or not is being discussed in the results. The instructors chosen to teach these classes spoke French reasonably well, that is to say that a certain amount of American influence or accent was noticable among all of them but there were no extreme cases in performance on their part. The classes were furthermore visited frequently by one of the investigators.

Eighty-one discrimination frames, or a total of 2 1/2 hours, constituted discrimination training, out of 25 hours of recorded laboratory materials for Part I. Thus in the first nine weeks of the course the experimental students spent 25 hours in the lab while the others (Fall semester) spent 22 1/2 hours. It can be reasonably assumed that nobody did any of these discrimination frames a second time, since students seemed to regard this portion as an inessential aspect, that must be done because their books are checked.

Results were tested through the following examinations:

1. The student was asked to repeat an utterance that he heard over earphones in the language laboratory. His response was recorded on tape. The utterances to be repeated consisted of monosyllables to 5 syllable utterances.

2. The student recorded a reading passage consisting of an eight line dialogue which had been presented in the laboratory several weeks before. He, therefore, was familiar with the text and understood its meaning.

The recorded portions were evaluated by Professeur Niedzielski. The results are based on 63 test items that were subdivided into the following groups:

1. Phonemes that do not have a correlate in the English sound system: /õ,y,y,ẽ,ã/
2. Consonants that have an approximation in the English system: /p,t,k,l/
3. Vowels which have a correlate sound in the English system: /e,a,o/
4. Phonemes occuring in cognate words: /l,e,a,y,r/
5. All the phonemes which occurred in the utterances to be repeated after a model.
6. All test items.
7. The phonemes that occurred in reading.

Results

I Quantitative analysis

	Control		Experimental		Significance
	Boys	Girls	Boys	Girls	tested by F-ratio
aptitude	112.51	127.70	112.11	111.31	.01
Variable 1	11.68	12.10	9.88	10.62	.01
Variable 2	6.98	7.18	6.66	6.37	NS
Variable 3	4.57	4.50	5.18	5.03	.05
Variable 4	6.19	6.58	6.57	6.48	NS

Variable 5	29.45	30.36	28.62	28.79	NS
Variable 6	41.11	42.98	39.77	40.13	NS
Variable 7	11.65	12.62	11.14	11.34	NS

There is no significant correlation between aptitude and other variables. The lower third in aptitude ranking are significantly inferior to the middle and upper third, but there is no significant difference between the middle and the top third. Likewise there is no significant difference between the top 15 per cent and the large group of average students.

When the groups were separated according to sex, the mean of the girls in the control section--at the very upper limit of the middle third--was significantly superior to the mean of the boys of the control sectionand the mean of the boys and of the girls in the experimental group. The scores they achieved in the vowels that had no English correlate (variable 1) were significantly better than the scores obtained by the other three groups. However, their aptitude was so much above that of the other groups that it muddied the inferences to be drawn and made it difficult to tease out relationships to the other variables.

In comparing the control section with the experimental section, the control group was superior to the experimental group in the vowel sounds that had no English correlate: the boys in control group were superior to the boys in the experimental group, and the

girls in the control group were superior to the girls in the experimental group. On the other hand, the scores of the experimental group in variables 3 (French vowels that had an English correlate) were significantly superior to those in the control section: both boys and girls of the experimental group were superior to the girls of the control group.

Variable 1 and 3 were the only significant variables. All other variables were highly intercorrelated and did not distinguish the control from the experimental group.

II. General Impressionistic Evaluation

1. Utterances which a student had to repeat from a model:

All "Deviations from phonemes" and "mismanagement of allophones"[9] were considered incorrect. "Deviations from phonemes" are deviations from near-native control. "Mismanagement of allophones" consists of mismanagement of allophonic details which is normally the source of a foreign accent in otherwise fluent speakers.

a. In the experimental group, "deviations from phonemes" are rare, that is, substitution of /u/for /y/, /ʃ/ or /z/ for /s/ in monsieur, /lavyãd/ for /lavyõ/; /frãse/ for /fyãse/: /sezã/ for /syizãrtar/. Such deviations were rather common in the control group. Roughly a fourth of the utterances were either wrong or impossible to understand, for example: "j'apprends la viande" for "je prends l'avion". Many times, one, two or three phonemes which were used as test items in the sentence were perfect, although

the sentence was only a conglomeration of phonemes without meaning. Therefore, the conclusion that the experimental students were much more able to repeat utterances than the control students seems valid.

b. Most common defects among the experimental students consisted of "mismanagement of allophonic details." For instance, some nasal vowels are not nasal enough permitting confusion between "je ne pense pas" and "Je ne passe pas". Some final consonants are not quite voiced enough as in "il mange": /ilmaʒ/ for /ilmãʒ/. Communication, however, is rarely impaired by this kind of deviation. Therefore, it may be said, that although some vowels were rejected because they were not exactly French, they were much closer to French than the same sounds rejected in the control group.

c. In the experimental group about 12-19 per cent corrected their own pronunciation. In the control group this occurred rarely (less than one percent).

2. Utterances that were read:

a. The same remarks of how close the various sounds came to the French model apply here also.

b. Fluency by the experimental group was greater than for the control group. The experimental students read the sentences much faster than the control students (about 2/3 of the time).

c. Liaisons and the general intonation features sounded more French by the experimental group than by the control group.

d. In the experimental group, stress and rhythm features were closer to French than the individual phonemes.

Discussion

The general impressionistic evaluation clearly shows the difficulty inherent in the problem of judging pronunciation. At what point is a sound to be accepted or rejected? It is a problem of approximation. A foreigner rarely pronounces a foreign sound exactly as a native does. If narrow boundaries are established students with such particular training may come closer to those boundaries and yet not fall within them.

The various intonation features, stress, rhythm, phrase modulation, and the like, furthermore complicate the problem. A number of variations are acceptable but much more difficult to identify. A general impression cannot be quantified for analysis by the computer. Professor Eddy reviewing pronunciation in his 1964 report worded the results as follows: "I have the impression of listening to French read by a non-native, but only here and there is it evident that the student's own language is English. In other words, the student's native language phonology is no longer dominant, and here is a very important step forward." 10

The fact that the girls of the control group were so much superior to the other groups and the fact that there was no comparable group of girls in the experimental section makes it difficult to compare the two groups and may invalidate comparisons. It is the author's impression that the experimental group who began French in the Spring semester had a more negative attitude towards learning

a foreign language than the control group who enrolled in the Fall. Most of these students started their foreign language requirements late because of fear or a feeling of inadequacy in learning a FL. This suggestion seems to be validated by an attitude survey testing their feelings of learning pronunciation through Osgood's Semantic Differential scale. While more than half said that learning pronunciation was important, only 42 per cent (27 out of 63) considered learning pronunciation to be meaningful. Further information about attitudes between the control and the experimental groups has been gathered but has not yet been analyzed.

The importance of the learner's attitude has been demonstrated in Lambert's [11] studies in which the results obtained in Maine--where the population is proud of its French heritage--were compared with those obtained in Louisiana, where the population tended to hide their French ancestry. In the absence of any pronunciation controls in class, students' attitudes may well have a decided influence on the results, regardless of the method of learning.

The superior performance of the girls in the control group in variable 1 further substantiates the role that attitude plays towards pronunciation. Having a positive attitude as they encountered a difficulty--sounds which do not exist in English--they put forth the necessary effort and achieved superior results, while the others (boys in the control group and the experimental students) did not consider the task worth their effort.

The superior results of the experimental group (both boys and girls) over the girls in the control group in variable 3 (vowels which have an English correlate) confirms the effectiveness of discrimination training in a task that seems not particularly difficult. Their behavior could be influenced without arousing negative feeling. The discrimination exercises had an effect in spite of its low rating in meaningfulness by the learners.

The superiority of the experimental group in pronouncing the French vowels which have an English correlate (variable 3) also explains why the speech of these students sounds more French than that of the control group. These sounds color the entire utterance, since 32 per cent of the French sound inventory fall into this group while the French sounds without an English correlate (variable 1) constitute only 9 per cent of the sound inventory.

The quantitative results and the impressionistic evaluation supplement each other. The fact that the experimental students showed superior results in variable 3 over the control group reinforces the impressionistic evaluation, to wit that the speech of the experimental students sounds more French than the speech of the control students. The fact that the control group was superior in variable 1, the sounds that do not have an English correlate, does not invalidate that impression. Only three sounds in variable 3 out of a possible eight vowels were selected, while five sounds out of a possible five in variable 1, the sounds that have no English correlate, were analyzed. The study

was, therefore, weighted in favor of the greatest difficulty, and favored the students with the more positive attitudes towards FL learning.

Other questions suggest themselves. To what extent does the instructor influence the student's pronunciation? Even though he is not involved in the teaching of pronunciation, he speaks French in class constantly and thus serves as a model. The average graduate assistant usually mispronounces the French nasals and in general the sounds that have no correlate in English. The student is thus exposed to an equal amount of time hearing a correct and an incorrect model. The instructor furthermore did not correct the student's mispronunciation, nor did he ever test the student's spoken performance, thus giving the impression that pronunciation in unimportant. He thereby strengthened negative attitudes which were already present.

But why didn't the instructor have a similar effect on the high aptitude girls? The question cannot be answered; this fact can merely be confirmed. When the results obtained by the control students were compared between the seven teachers involved, the one graduate assistant whose pronunciation was the poorest--atrocious, indeed--had a class of high aptitude girls and showed the best results in variable 1.

This study also suggests that the instructor will always play a decisive role in the learning process, even if the learning itself

occurs exclusively outside of class. He alone provides the discipline and the motivation needed for learning and influences the learner's attitudes which seem to affect the outcome.

A replication of the study should more carefully distribute the test items between the various variables and also attempt to quantify the intonation features. It should furthermore attempt to evaluate the influence of the instructor from the point of view of the emphasis he places on pronunciation rather than the instructor's own pronunciation. The disparity of student aptitude and thus the inferred negative attitudes should be eliminated by choosing a group of subjects beginning their French studies in the Fall semester rather than in the Spring semester.

Conclusion

Two types of evaluations a quantitative study of pronunciation and an impressionistic evaluation of the total utterances seem to demonstrate the effectiveness of discrimination training. The impressionistic evaluation clearly states that the French of the experimental group is superior to that of the students in the control group. The quantitative evaluation suggests that the experimental students are superior only in variable 3, the French vowels that have an English correlate, while the control students are superior in variable 1, the French vowels which do not have an English correlate. Variable 3, though, is most frequent in the language, and gives it its

French flavor. In all other variables the two groups were not significantly different. In view of the fact that the test was heavily weighted towards variable 1, and because the aptitude of the experimental group was so much inferior to the aptitude of the control group (girls), the impressionistic superiority of the experimental group seems to be a valid conclusion and does not seem to be contradicted by the quantitative evaluation. Discrimination training seems to be an effective training device in the learning of pronunciation.

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